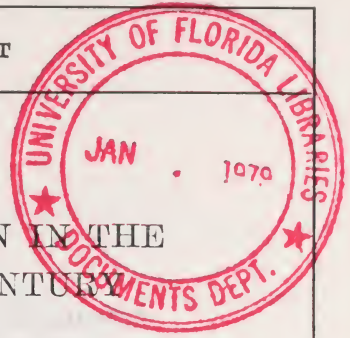


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COMMITTEE PRINT



THE POTOMAC BASIN IN THE
TWENTY-FIRST CENTURY

PROSPECTUS FOR A REVIEW OF POTOMAC BASIN
RESEARCH

PREPARED FOR THE
SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY
AND THE DISTRICT OF COLUMBIA
OF THE
COMMITTEE ON GOVERNMENTAL AFFAIRS
UNITED STATES SENATE

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(II)

LETTER OF TRANSMITTAL

U.S. SENATE,
COMMITTEE ON GOVERNMENTAL AFFAIRS,
SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY
AND THE DISTRICT OF COLUMBIA,
Washington, D.C., November 1, 1978.

Hon. ABRAHAM RIBICOFF,
Chairman, Committee on Governmental Affairs.

DEAR MR. CHAIRMAN: The Subcommittee on Governmental Efficiency and the District of Columbia has asked the Congressional Research Service to undertake a comprehensive study of the Potomac Basin. The basin is a precious historic resource, and the Subcommittee believes that its preservation and enhancement is of vital national concern. Attached is CRS first report on the scope and substance of the study, and I respectfully request that it be issued as a committee print so that it can serve as the basis for discussion in the furtherance of the study.

Sincerely,

THOMAS F. EAGLETON,
Chairman.

Enclosure.



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THE LIBRARY OF CONGRESS,
CONGRESSIONAL RESEARCH SERVICE,
Washington, D.C., September 19, 1978.

HON. THOMAS F. EAGLETON,
*Chairman, Subcommittee on Governmental Efficiency and the District of
Columbia,
Committee on Governmental Affairs,
Washington, D.C.*

DEAR SENATOR EAGLETON: I am pleased to submit this plan for a review of Potomac Basin Research by the Congressional Research Service.

As we have agreed, we shall submit individual reports to you under this general plan as they are completed.

The project will be under the direction of Dr. Franklin P. Huddle, senior specialist for science and technology.

We are grateful for this opportunity you have afforded us in your joint request, to undertake a new enterprise in congressional service—a substantial, protracted, multidisciplinary examination of the problems and opportunities of a large geographic region having as a common and shared resource one of the major rivers of the United States.

The relevance of this river to the Congress is threefold: first, as a major geographical entity under congressional jurisdiction; second, as a potential model for legislative and administrative concern nationwide; and third, as an area surrounding and intimately related to the National Capital.

It will be instructive to see whether this study can identify the shared goals and objectives of the people who live in this geographical area; whether the lessons learned in this study will be pertinent to other river basins and to the United States generally; and whether the findings of the study can generate interest and support of the inhabitants of the Potomac Basin in concerted efforts toward their shared goals.

In any event, whether limited in application or broadly applicable, this is an interesting assignment and one that will be pursued with vigor.

Sincerely,

GILBERT GUDE
Director.

FOREWORD

This is a response by the Congressional Research Service to a challenge from the U.S. Congress: can CRS address itself to the analysis of policies and provisions affecting the people and the resources of a major river basin, from the downstream metropolis and its suburbs to the upstream heartland?

What is proposed in this initial study is a methodology, a scope of analysis, and an outline of a series of reports all relating to the interaction of Congressional legislation with the people, the water, the land, and the economic activities of the Potomac River Basin.

Of particular note is the fact that the geographic area in question is the subject of study and shared jurisdiction of the Federal Government with the Governments of Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia. In turn, these several States share jurisdiction with their contained counties, cities, towns, and lesser political subdivisions.

Among the salient questions to be explored in the study will be such matters as the following: What will the Basin be like in another century if no change is made in its processes of management and use? What changes do the people of the Basin desire, and are they frustrated in the achievement of these desired changes? What are the actual and potential resources of the Basin that could afford opportunities for betterment to the people of the Basin, and how might their development be enhanced? What conflicts and tensions are implicit in the answers to these questions, and what options are available to mediate them?

It is important to recognize that there have been many studies in the past of the Potomac Basin, its subordinate parts, and such subject areas as soil and water management, fishery, forestry, agriculture, recreation, and many other elements. Review and assessment of past studies is necessary to provide foundation for further data collection and analysis. The ultimate product of the effort should be a more comprehensive identification of options and opportunities, to enable the Congress, in consultation with the people of the Basin, to make wise choices as to the future course to be followed. There should be no foregone conclusions, here; if some options are for change in direction or level of effort, at least one option should be to leave things alone. But no particular course should be assumed in advance.

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I. INTRODUCTION

The purpose of this study is to respond to a request jointly addressed to the Congressional Research Service by Senators Thomas F. Eagleton and Charles McC. Mathias, Jr. The request specified that CRS should—

Examine the circumstances that make the Potomac a wasting resource, ascertain the forces that operate to improve or worsen its social value, and identify longrange legislative initiatives to coalesce and activate the forces for its betterment.¹

The Eagleton-Mathias letter went on to suggest a longrange objective that they sought to achieve by this initiative. It was:

To set in train a process that could operate for a century, steadily improving the entire Potomac Basin from headwaters to estuary, toward the goal of a clean and living symbol of beauty and environmental quality for all the Nation to enjoy.²

Implicit in the request was the further concept that the Potomac Basin should become a practical demonstration that commercial utility can be sustained in a region without impairment of esthetic values and that a technological approach to the balanced management of a river basin can be made politically acceptable and socially desirable.

Why Is Another Potomac Study Needed?

Over the years an extraordinary number of studies have been conducted of the Potomac River and its drainage basin. The geographic proximity of the river to the National Capital lends it particular salience and has caused much attention to be given to its present condition and future prospects. Accordingly the question is appropriate: What purpose is served by yet another study? One purpose of this prospectus is to answer that question. However, a short answer would be about as follows:

Despite the many studies of the Potomac River Basin, the dynamics of the political, economic, and technological condition of the region has not markedly changed in response to the findings or recommendations of these many studies. What obstacles are encountered by efforts at implementation? Are the studies themselves defective or incomplete? Is it possible to approach the subject with more of an action orientation? Can aspirations and preferences of the various groups within the region be constructively reconciled? Are there serious and real new technological threats or neglected opportunities to be recognized and dealt with? Is there a real danger that a continued, and

¹ Letter to Director Gude dated May 20, 1977, p. 1. Full text of the letter and of Mr. Gude's reply, dated May 27, are presented as appendix A to this study.

² *Ibid.*, p. 1.

studied course of inaction—"benign neglect"—might lead, bit by bit, to an irreversible condition of environmental or economic catastrophe? Conversely, are there signal advantages to be gained by a program of small, systematic, persistent actions? How can the lessons of the many studies of the Potomac Basin be supplemented by a dynamic, responsive attitude on the part of the inhabitants of the basin and their political representatives at all levels of government?

Importance of the problem

One aspect of the Potomac Basin that makes it of importance to the Congress derives from the fact that it is the locality surrounding the Nation's Capital, and the leading political center of the democratic world. This prestigious situation, it is suggested, carries with it the obligation to maintain a clean, healthy, esthetically satisfying city. But the city cannot achieve these qualities if they are not also maintained in the outskirts, the environs, and the surrounding States. The entire Potomac Basin, as the setting for the National Capital, requires conditions that sustain a healthy, happy, productive livelihood for all its inhabitants.

Then too, the United States is generally viewed as possessing two great skills: of technological expertise and political-administrative management. But neither of these two valued attributes is now manifest in the present condition of the river and its drainage system.

A third point is that each year millions of tourists and school children make the pilgrimage to the Capital City of the United States, where they ought to find a universally high standard of excellence in the management of the environment, as a part of the general education in citizenship that is their purpose in visiting the National Capital.

Fourth, an important and central segment of the National government is located in the District of Columbia and such nearby localities as Arlington, Alexandria, and Fairfax County on the Virginia side of the Potomac and Montgomery and Prince George Counties on the Maryland side. It would seem important that the Members and staff, of the Congress, and the civil servants of the National Government had before them at all times a practical demonstration of respect for nature and for man's relation to nature.

Some suggested concerns of the Congress

The preceding section identified a number of ways in which the condition of the Potomac Basin might warrant congressional attention. In a recent letter to the Congressional Research Service, a long-time student of Potomac Basin conditions and opportunities offered the following expansion of this theme:

Congress holds two types of influence over the Potomac. One aspect is true of river basins nationwide, and one is unique to the Potomac. The former influence stems from the type of approach which characterizes most resource management and human services legislation. Because the implementation of U.S. laws falls under the Executive Branch of the government and not the Legislators themselves, the mandates are usually the responsibility of a single federal agency. Responsible agency energy, naturally, goes into fulfilling its specific responsibilities (which are often considerable, and frequently must be administered within tight time frameworks and financial uncertainties). There is little emphasis upon coordination of that particular

legislative mandate with other related programs. The result is wasteful duplication between program efforts, and serious gaps between programs which lie unaddressed. We end up with the least information where we need the most, namely, about the interfaces between methods for managing individual resources and the different human services. Beyond providing an oversimplified picture of program management, the narrowly mandated programs also serve as a convenient hiding place for agencies who skirt difficult questions by retorting, "That's not our responsibility."

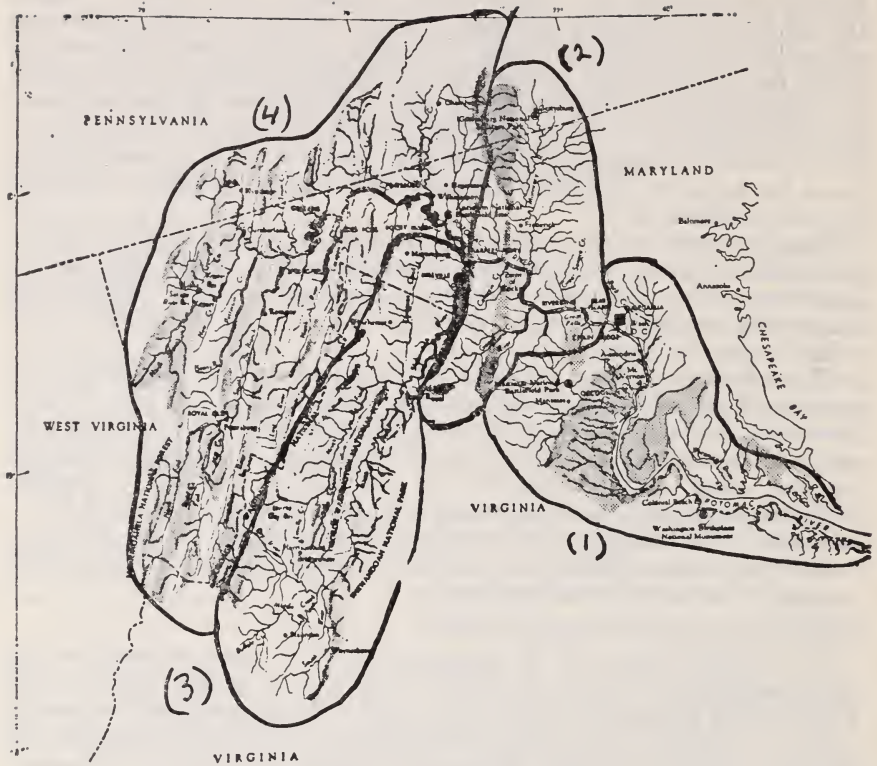
Thus the very nature of our single purpose legislation tends to create an implementation atmosphere counterproductive to the best use of resources and to the most effective management of the dollars and manpower available for their development and for the provision of other human services.

The unique influence imposed by Congress on the Potomac is its presence here in the national capital. This, again, has two results. First, the Potomac thereby becomes of potential political interest to every Congressman as well as the White House, a distinction shared by few other natural resources in the nation. Secondly, because Congress maintains the headquarters of many federal agencies in D.C., a whole additional level of government is involved in all decision-making processes. "National" becomes superimposed upon the normal pattern of local, state and regional.

Definitions of Some Principal Terms

The central theme of the proposed study is the development and management of a particular region of the United States, the drainage basin of the Potomac River. The concept of a geographic "region" is that it is an area possessing some particular unifying feature, in the present instance a single common drainage through the Potomac River into the Chesapeake Bay.

The region, while possessing in common the drainage feature, can be further subdivided into four main sub-regions: (1) the main tidewater river that flows past the District of Columbia, between Maryland and Virginia; (2) the upper main stem, with its tumultuous Great Falls, its many islands, wooded banks, rocky ripples, wide shallows, and deep channels, until it terminates upstream at the spectacular division of its flow at Harper's Ferry; (3) the winding Shenandoah River, draining that historic valley to the south; and (4) the mountainous northwestern region, together with a small portion of the Appalachian Plateau, that drains territory of four States, as its several rivers cut through a succession of north-south ridges, before joining with the southern branch to cut through the last barrier in the Blue Ridge. (See map.)



Technology

Implicit in the terms "management" or "development" of a region is the application of technology to a geographic entity. In this usage, the term "technology" means more than tools. It encompasses not only physical structures and hardware, but also social inventions and organizational processes. It is man cooperating purposefully and systemically with nature for beneficial and sustainable social and political goals.

Political and Social

The distinction between the two adjectives "political" and "social" for purposes of the study is that the former refers to governmental functions and attributes while "social" refers to non-governmental group activities, organizations, and interests.

Resources and Reserves

Contemporary usage in the field of minerals distinguishes "reserves" from "resources" in that the former are capable of being exploited economically with present economic conditions while the latter require changed economic conditions in order to be exploited economically. Resources are potentially useful, while reserves are immediately of value.

This distinction is not observed in agriculture and forestry where the term "resource" is more loosely applied to all soils and forest growth. The abandonment of the distinction is caused by the fact that eco-

conomic development depends much more on individual management of farms and woodlots. Accordingly, in the discussion of mineral value in the Potomac Basin, reserves will be distinguished from resources, but not in discussion of other natural values.

Scope and limitation of the study

The study is to address the Potomac River Basin and its development. It does not address geographic areas outside of the Basin.

The focus of the study is on future opportunities and actions to realize them; an important part of the present study will be the review of the many past studies which have also had this focus. Particular attention will be given to an examination of the feasibility of past recommendations. Development implies both economic and social betterment, and both social and political organization in the application of technology to resources and reserves. Here, too, past efforts at development—both public and private—are of interest in the present study; historical events generally are of interest both intrinsically as a part of the culture of the Basin and as an indication of past efforts to exploit the resources and reserves of the Basin.

It is recognized that there are many current issues that are being urgently called to the attention of the Congress, and in which positions taken by different sectors of the Basin's people are at sometime emphatic variance. For example, an assured supply of potable water for the metropolitan area of the District of Columbia, methods for attacking point-source and diffused source pollution, the preservation of agriculture or forestry or open spaces in the upper Basin, resolving competition for the estuary's shoreline and its resources and finding locally acceptable resolution of the competition for upstream shorelines, resolving conflicts among competing programs of Federal agencies, and—perhaps a little later on the issue of attention to ground water resources in the Basin.

While it is recognized that these are all legitimate and pressing concerns, the study does not propose to meet them head on, but rather to develop a solid factual data base and a set of applicable resource management principles relative to the Potomac Basin to assist the interested parties in achieving agreement on preferred options in these issues.

Elements to be studied

In a systematic approach to the study of the Potomac Basin and the problems of its development, attention must be addressed to the physical configuration, and to the component subsystems or subregions. Such questions as the following need to be considered and analyzed:

What objectives should be sought in Potomac Basin development?

How do the people who dwell in the various regions of the Basin view the question of its development?

What are the resources and means of development?

What planning has there been in the past, and with what consequences?

What obstacles stand in the way of development of the Basin and how might they be overcome?

What are the likely consequences of neglecting to examine these questions?

The concept to be followed is that there are four large and important subregions of the Potomac Basin, each with its own set of resources, concerns, and objectives; and that there are important interactions among these four districts that need to be defined, accommodated, and sometimes compromised.

Possible consequences of the proposed CRS study

The concept is that a systematic series of individual studies, each desirable and useful in itself but also serving as building blocks in a larger and more comprehensive study, ought to yield many worthwhile results.

At very least, the composite study should help decisionmakers at Federal, State, and local levels to ask the right questions in making plans for the future of the Potomac Basin.

Each of the individual studies should provide a coherent collection of basic data and analyses of some important aspect of the Potomac Region.

The study as a whole should define the essential scope of analysis.

The study and all its contributing parts, issued to the Congress and to the public over a period of years, should motivate attention to the question of the future of the Potomac River Basin, of time-phased changes likely to occur or to be sought, and of the roles of individuals and groups in working out the goals of the region.

It may be too much to hope for, but it would be gratifying if the results of the proposed study helped bring to the people not only of the District of Columbia but of the entire Potomac Basin, and indeed of the United States, in the words of the Eagleton-Mathias letter,

A clear river, an esthetically sound and benign environment, a safe and healthy recreation facility, and an assured quality of potable water.³

Plan for the prospectus

The rest of this prospectus will consider in sequence the background and the present status of the region, the mobilizing of professional expertise to contribute the various elements of the study program as well as the active seeking out of an input from the people who live in the area, a catalog (with commentary) of the separate components of the study, and—finally—a few observations as to the requirements of an action program for the Potomac Basin.

³ Ibid., p. 1.

II. BACKGROUND OF THE STUDY

The primary and statutory "customer" for products of the Congressional Research Service is the Congress itself. Accordingly, it is necessary to demonstrate as justification for such a major study as is here proposed the congressional interest in the subject, the prospect of legislation affecting the region, and the evidence of past legislation serving to pave the way for more comprehensive future action by the Congress. What does the Congress need to know about the effectiveness of past legislation affecting the Basin? What are the options for further legislative initiatives in the region? How does the treatment of the region relate to the interests of the National Capital, and how do actions of the District of Columbia impact upon the inhabitants of the Potomac Basin—upstream and downstream?

Past legislative enactments on Potomac matters

In one sense legislation dealing with the Potomac River has run concurrently with the history of the American Republic. Indeed, the convening of the Constitutional Convention itself grew out of an effort by George Washington to resolve issues of jurisdiction and equity on the River as a necessary preliminary to upstream development. Subsequently, the decision of the Congress to locate the National Capital athwart the main stem of the Potomac has had interesting consequences for both the River and the Nation. One feature was the fact that during the great Civil War the main stem east of Harper's Ferry served as a boundary between North and South. The names Ball's Bluff, Sharpsburg, Harper's Ferry, reflect this part of the Nation's history. Moreover, unattended scars of that conflict, and unresolved political dissatisfactions, still linger in remoter upriver parts of the Basin.

It might have been supposed that a major river washing the shore of the governmental center would have received as much legislative attention as did the Tennessee, the Columbia, or the Colorado. There is good evidence that vast geographical differences and the scars of the past intensify present differences in outlook and desires of the Valley's peoples, and help to account for a lack of consensus and a resistance to proposals for national programs along the River.

However, while periodic attention has been given to legislation for the Potomac River, the river's configuration does not invite the kind of attention commanded by the other major rivers of the nation. It is not a vital artery of navigation like the Ohio. It does not have the damaging floods of the Mississippi. It does not convey priceless irrigation water to parched regions like the Colorado. It is not a huge reservoir of electric power like the Columbia. By contrast the Potomac, apart from its function as a source of potable water and a means of sewage disposal, contributes to the region it serves primarily those less tangible values of recreation, environmental gratification, and esthetic appeal. In short, the river provides a place to live, a way of life. In the past these values have not usually received extensive

legislative attention. However, one hypothesis of the present study is that increasingly in the century to come these values will come to be recognized as of greater importance. A second hypothesis is that the relation between environmental preservation and human survival will become understood as direct and perilously important.

Over the past two centuries the Congress has had much to do with the Potomac River. For much of that time span the legislative concerns have encompassed small pieces of action: whether to prevent flooding at the Lincoln Memorial, what to do about water hyacinths in the backwaters of the estuary, channel dredging and the construction of filled land at East and West Potomac Parks, and so on. Only a few of the many Potomac studies mandated by the Congress have been really comprehensive. More often, too, the studies have involved single-agency responsibilities, without the necessary coordination of related agencies and functions. The possibility may exist that the requirements of the future cannot be met without more purposeful and concerted action by the Congress. The possibility may also exist that an entirely new kind of approach is needed.

Congressional mandated studies of the basin

A separate set of legislative considerations would consist of studies ordered or authorized by the Congress to deal with various aspects of the Potomac Region. One such study is currently underway, under the management of the National Academy of Sciences-National Research Council, with the Corps of Engineers as sponsor. The question raised by the Congress that this Academy study will answer is whether the water of the Potomac estuary below Little Falls can serve to augment the water supply of the metropolitan area of the District of Columbia. But there have been many other such mandated studies. Here the question becomes: what have been the findings of such studies, and what actions have resulted? Is it possible to aggregate the findings of such studies with a comprehensive picture of the basin? What further information is needed in order to provide the basis for a comprehensive, workable, and acceptable future plan?

To the people in the Washington Metropolitan Area the assured availability of potable water of reasonable quality is a matter of some concern. It is less commanding of public attention upstream in those areas where dams have been proposed to impound water for storage to raise the low flow of the main stem during dry periods; such proposals are usually resisted by those upstream.

A quick review of congressionally mandated studies, as suggested by Paul W. Eastman, executive director of the Interstate Commission on the Potomac River Basin, would emphasize the comprehensive studies of the Basin from 1932 on. (Earlier studies were restricted in geographic or technical scope.)

A first comprehensive river basin report was that of the Corps of Engineers published as House Document 101, 73rd Congress, 1st session, 1934. Its scope extended to hydro-power, navigation, flood control, irrigation, municipal water supply, and park development. However, its action recommendations were trivial.

A second report on the Basin, 12 years later, proposed a system of reservoirs for flood control and water power.

Another report, in 1963, was mandated by the Senate Committee on Public Works instructing the Corps of Engineers to formulate a comprehensive plan for "control of floods and development and conservation of the Basin's water and related resources." And later, the Committee amended its instruction to include recreation, conservation of municipal water supply, and pollution abatement. A comprehensive engineering plan resulted: it called for 418 small headwater reservoirs, 16 major reservoirs, and elaborate arrangements for the treatment or control of polluting effluents.

Reaction upstream to the 1963 report was adverse. Successive further reports and studies scaled down the plan, and by 1978 the sole active residue is the Bloomington dam plus exploratory work on tapping the estuary for municipal water supply.

Characteristically each user of the river is more concerned with its treatment by those upstream than with the needs of those downstream. Pollution from acid mine drainage or from pesticides from agricultural run-off may threaten sport fishing downstream. But those who fish may not welcome regulation that limits their own use of the river. Similarly, commercial fishing in the lower estuary of the Potomac can be seriously affected by urban pollution, storm drainage, and pesticides from upstream, but costs of urban pollution abatement measures are often viewed as prohibitively high, or at least of questionable or unproved cost-effectiveness.

Statutes and programs applicable to the region

A subject of large scope is the cataloging and analysis of legal findings, legislative enactments, and Federal programs applicable to navigable waters in general, or to forests or minerals or farms, or to municipalities, the inhabitants, or their roads and other public services.

In particular, there are Federal legal findings, and laws, and Federal programs relating to recreation, environmental quality, and the preservation of esthetic values. The interaction of all these principles and programs with the Potomac Basin would be a task exceeding the time and energy available for the present study. However, a survey of relevant situations and topics might conceivably be undertaken, in order to identify principal problems and opportunities for further consideration.

III. THE PRESENT STATUS OF THE POTOMAC BASIN

The first step in any engineering enterprise is to prepare a status report. What is the condition of the total system into which change is to be introduced? What are the elements favoring or supporting desired change and what elements present obstacles? What is the dynamic in the system? And what are the present directions and rates of changes of elements in the system?

Present resources of the Potomac Basin

Four sets of resources today contribute to human satisfactions in the Basin: physical, political, social, and technological. Among the physical resources are the river itself with all its tributaries, rates of flow, profiles, and clarity, and the edible species that live in it. Other physical resources are the soils, minerals, varieties of terrain and climate. The political resources encompass skills in decisionmaking, a comprehensive body of law, and organization along successive tiers from Federal to municipal. The social resources include an educated, politically experienced, and technologically sophisticated population with diverse ethnic, religious, national and cultural backgrounds. This population is organized into a myriad of groups for many social purposes, some of which relate directly to the use or improvement of the Basin and most of which relate to it in some way. The technological resources of the Basin include networks of transportation and communications systems, a diversity of housing, and both potential and developed resources of energy in the form of coal, waterpower, and wood.

Complexities and variations confronting the analyst

Four sets of discontinuities complicate Basin development; like the resources, they are physical, political, social, and technological. The principal physical discontinuity is the variety of terrain that tends to divide the population of the Basin into different segments, with widely different goals, purposes, life styles, and customs, which tend to diversify thought and effort in Basin-wide development or planning. Not only are there marked differences in these factors among the four major subregions of the Basin, but also within the ridge-and-valley terrain of the four State, northwest sub-region. The varieties of political form center on the sheer multiplicity of jurisdictions, overlapping in scope, differing in interests, and conflicting in goals. The effect of these disparities is for the differing political units, State and local, to perceive problems and opportunities differently, and favor different approaches and different values in their resolution or application. Similarly, there is a social diversity of interests, derived from differing social responses to differing geographic setting, and historical differences in values. Finally, there are technological discontinuities across the Basin. These appear to result from a series of commitments to technologies that rose and waned: thus, early coal mining stripped the land of protective cover and released acid into the northwestern

tributaries; early tobacco culture exhausted the thin soil of the tide-water, and left the land to revert to thickets and brambles. Whether the technology of the internal combustion engine during the next century will also run its course, and leave behind a waste of useless artifacts and costly highways remains to be seen. However, it is possible that today's emphasis on speed of movement over water, land, and air will not be indefinitely sustainable. And certainly the Potomac Basin would be a very different setting in the event that automobiles, trucks, powered farm implements, motorboats, and aircraft should be replaced by some more advanced technology as they in turn replaced steam power, and steam power replaced the horse.

Actors, actions, and rates of change

Many different people, groups, institutions, and political jurisdictions are doing things to the Potomac River and its drainage basin. Although the analyst of this scene is concerned with the aggregate effects of the acts of all these actors, the actors themselves need to be aware of the consequences of their actions on the region. Incremental benefits and incremental injuries happen constantly.

Such plus-and-minus effects result from: retention of ground cover, full treatment of sewage and industrial waste, recycle of rural and urban solid wastes, sealing of mines, and restoration of stripped lands and conversely the run-off of farm pesticides and fertilizers, housing starts, mining and industrial operations, urban sewage and waste disposal, as well as the effects of logging and clearing, swamp drainage, oil spills and disposal of crankcase lubricants, dumping and littering.

All these different actions are going on all the time, some improving and some degrading the Basin environment. It is difficult to estimate at any given time whether the cumulative *plus* effects outweigh the cumulative *minus* effects or vice versa. However, one fact is certain: the coordination of beneficial actions, and the coordination of efforts to stem or reverse injurious actions, could have a profound effect on the relative plus-and-minus rate of change. Moreover, it is also probable that the consequences of concerted efforts at Basin betterment, however defined, would generate public attitudes that could either oppose or reinforce these programs.

Apparent future prospects for the basin

It would be worthwhile to examine the probable future course of the Potomac Region, on the basis of various assumptions. One such assumption might be that, in the future as in the past, concerted corrective action will not be motivated until a crisis is near at hand, and that the actions then taken will be limited in scope to those to avert the crisis or mitigate its consequences.

Another assumption might be that the various programs of Basin improvement will be small in scale and unsystematic—and unrelated to any general theory or plan of broad regional betterment.

A third assumption might be that each of the several principal political jurisdictions (i.e., State Governments) in the Basin will continue to maintain positions calculated to benefit their own constituencies at the expense of the other residents and jurisdictions in the Basin, with the role of the Federal Government as a whole indeterminate, while individual agencies pursue their separate and often conflicting courses.

A related assumption is that the future of the Potomac Basin will see no institution created with the competence to plan and the authority to motivate the implementation of plans for the betterment of the region; that public attitudes toward regional goals and projects will continue to be splintered; that individual goals and wants will operate in conflict with each other and against the general wellbeing of all.

These are, of course, only assumptions. A contrary, more optimistic set of assumptions might be offered instead. But a careful analysis of present trends projected into several future "scenarios" might serve to motivate political and public willingness to accept a more programmed course of action. On the other hand, a scenario calling for a systematic and programmed course of action could motivate political and public resistance and stiffen the resolution to leave things as they are. This may indeed be the central dilemma of the Potomac Basin.

IV. ORGANIZATION OF THE PROPOSED STUDY

A first attempt at a listing of the component studies needed as the basic data for analysis of the prospects for the Potomac Basin is offered in this section. In the planning of research projects, the first outline is usually revised many times before and during the conduct of the whole study program; it is in that sense that the following outline is presented. As the study proceeds ways will be sought and comments invited on ways to improve the completeness of the listing and the indicated scope and direction of the individual components.

Toward objectives for the Potomac Basin

Early in the project there needs to be a thorough examination of its objectives—i.e., a cataloging and structuring of objectives for regional development of the Potomac Basin. What is sought is a comprehensive approach to the achievement of benefits and the reduction of undesirable features. The problem in defining objectives is that different groups have different values. A land developer may wish to drain a swamp that a nature-lover wants to preserve. A farmer's use of pesticides may injure the fishing. And so on.

Undoubtedly there are some values—if not objectives—that are shared by all, such as reduced pollution in the river, an end to malodorous sewage systems, available sources of energy for valley residents, and healthy systems of agriculture, forestry, industry, and employment generally. Acceptable objectives would seem to be those that serve such values at least cost to other values of the Basin's resources to sport and other entertainment, to esthetic enjoyment, to sense of history, and so on.

Most broad objectives can be subdivided into derivative objectives, and these in turn into still more detailed ones. One final product of a study of Potomac Basin objectives might be an "objective tree," at the ends of whose final branches would be single tasks or projects contributing to the succession of objectives. Another product might be a matrix analysis, showing the interaction of objectives, and ways in which specific tasks can contribute to multiple objectives.

Futures for the Potomac Basin

This topic would identify the key trends and issues controlling the future of the Potomac Basin. It would characterize the significant variables in these trends and shaping these issues; it would forecast directions and probable magnitudes of the variables; and it could use these analyses as the basis of a series of alternative scenarios describing the Basin in the year 2000 and thereafter.

Modern trends in regional planning

In formulating a broad plan for the Potomac Basin it would be helpful to have a brief examination of the methodology of regional planning as evidenced in three sets of literature, as follows:

- (1) Academic studies in the United States.

(2) Technical studies and other literature generated by U.S. regional commissions.

(3) Regional speculations produced by OECD and by UN agencies and regional commissions.

Literature of this sort could suggest precepts and criteria useful in setting realistic and acceptable goals and priorities for the Potomac Basin.

Preservation of natural beauty; compatibility of human structures

A philosophy of the conquest of nature by man has been increasingly replaced by a new "environmentalist" philosophy of the preservation of unspoiled natural beauty. It may be that proponents of both philosophies tend to overstate their case. To what extent should waterways be left as "wild rivers" and to what extent should they be claimed for multiple economic and other uses?

Similarly, in the management of a large speculative housing development, one school of thought is to remove all trees, skin off the topsoil, and then lay out the houses in an orderly geometrical grid with formal landscaping. An opposite school of thought endeavors to keep as many trees as possible, contour the houses to land, and rely on nature for much of the subsequent landscaping.

A third issue involves the use of compatible materials and designs of human structures to fit in with their natural surroundings, as illustrated by the Frank Lloyd Wright "Falling Water" house. Related to this concept is the esthetic principle of the simple use of common materials, as illustrated in the Cotswold area of Midland England, where golden brown oolitic limestone structures make the villages coherent unities.

What is the relevance of these three issues for the Potomac Basin? The implication would seem to be not that some absolute principle of esthetic or architectural rigidity should prevail throughout the region, but that these issues should be thought about. One very real source of tension is the conflict in values as between those who favor untouched virgin forest, wild rivers, and raw cliffs, those who favor a tame landscape with penned lakes, grasslands, flowers, and neat pathways. There is no absolute resolution of this tension but respect for these differing sets of values is necessary. By the same token, attention to the esthetic quality of man's impact on nature is also economically significant. What the roles of planning and cooperation should be must ultimately be determined by those who live in the region. But the decision should be an informed one.

Past plans for the Potomac

An inventory should be assembled of general and special studies of the Potomac Basin, or of parts of the Basin, or of uses of some or all natural resources of the Basin, or of human interactions with the Basin. For each study there should be an indication of scope, rationale, history, manager, methodology, observations, conclusions, recommendations, and subsequent impacts. The inventory should extend from 1785 to 1975.

This inventory should be more than a mere catalog. An essential feature of the project should be an analysis of the changing emphasis over time, from one study to another, and the differences in studies reflecting the chronological evolution of technical thought concerning regional development.

Present Potomac planners

This topic would consist of an inventory of Federal and State governmental agencies, boards, commissions, and councils, and Federal, State and local political jurisdictions sharing planning or operational responsibilities for natural resource-human relationships in the Potomac Basin. For each item, there should be an indication (to the extent appropriate) of the following elements: how created, and jurisdictions, organizational resources, accomplishments, public acceptance, and future prospects.

In order to define the institutional resources available to implement whatever course is discovered to be desired by a consensus of people in the Potomac Basin, an inventory of centers of political decision-making seems an appropriate starting point. The alternatives for implementation would seem to be, either the coordinated use of some or all of these centers of political decisionmaking in present systems, the creation of some new system, or acceptance of a status quo in which no coherent resort to implementing authority is accepted. Accordingly, an inventory of the institutional resources of government potentially available to make decisions and implement courses of action is a necessary starting point in any regional planning effort.

Overview and commentary on issues of the Potomac Basin

What are the principal issues relative to the evaluation, development, use, or conservation of the resources in the Potomac River Basin? It seems desirable to have available a reference study of these issues, perhaps catalogued according to the following outline:

- (1) The issue defined,
- (2) Significance of the issue,
- (3) Interactions of the issue with other factors and issues,
- (4) Quantitative elements of the issue,
- (5) Past trends in the evolution of the issue,
- (6) Future prospects for the issue,
- (7) Options in resolving the issues; for each:
 - (a) description,
 - (b) qualitative costs and benefits,
 - (c) opinions respecting,
 - (d) brief commentary.

The issues themselves would include such items as the following (although the list is far from complete):

- Potable water in the Washington metropolitan area (alternatives),
- Pollution from urban run-off,
- Sewage and sludge disposal,
- Siltation from land development,
- Agricultural run-off pollution,
- Afforestation of marginal lands and upgrading of woodlands,
- Acid mine drainage,
- Control of heavy metals and other toxic substances as pollutants,
- Public access to the waterfront areas,
- Land use in the Basin,
- Protection and restoration of historic sites,
- Strip mine management,
- Small tributary pollution problems,
- Responsibility for whole-basin planning,
- Division of management responsibility in the Basin,

Wild river versus flow stabilization,
 Non-use, or single use, versus multiple-use of resources,
 Adequacy of resource surveys,
 Holistic planning versus incremental planning for Basin development and use,
 Economic maximization versus balanced economic/social versus social maximization,
 Cost of estuary channel maintenance, etc., v. siltation control,
 Flood control aspects.

An inventory of Federal, State, and selected local laws affecting the Potomac Basin

A brief account should be prepared of each Federal statute addressing the Potomac Basin, per se, including legislative history, abstract of provisions, and significant relations to other statutes.

Similar accounts should be prepared for the laws of the States of Maryland, Virginia, West Virginia, and Pennsylvania addressing the Potomac Basin directly or indirectly, followed by a matrix analysis of key features compared for the major jurisdictions in the Basin, plus an analysis of the relations and important interactions of Federal versus State laws.

There might also be collected an annotated set of particularly important city, county, and small community ordinances affecting the Potomac river and its environs, with a commentary on their relations with State and Federal statutes, for selected key or representative local jurisdictions.

Finally, it would be desirable to have in being a general commentary on the coherence and effectiveness of present legal arrangements affecting the Potomac Basin.

A compendium of Federal laws and constitutional cases defining present authorities and policies of the Federal Government toward water, land resources, and human activities and their management in river basins

This would consist of an index and analysis of statutes and cases in Federal law that would be applicable to any Federal initiative addressing the water, land, resources, or human uses of the Potomac Basin. This index might be accompanied by a commentary on the evolution of political thought and values as evidenced by the changes in law over time, and a tabulation of options for Federal approaches to management of the Potomac Basin as indicated by existing Federal law.

Programs of Federal departments and agencies affecting the Potomac Basin

This topic calls for an inventory of Federal programs affecting the control and use of water, land, and other resources of the Potomac Basin. For each program, there would be an indication of legislative authority, typical funding available, scope and purpose, history and measure of past achievement, and future plans.

A separate section would assess interactions, coordination, and completeness of Federal programs, and summarize costs, effectiveness, and general impact of the totality of Federal programs.

Consideration might be given to inviting the General Accounting Office to prepare a study under this rubric, as a contribution to the project. Their qualifications to undertake an assignment like this would be incomparable.

The history of the Potomac and its basin

This heading calls for a bibliographical summary, chronologically abstracting the principal historical books, essays, technical reports, journal articles, and source documents giving the main features of the Basin's history.

A feature of the study could be a series of large maps ⁴ of the Basin, posting sites of recorded events by time periods, perhaps as follows:

Pre-history to 1500; 1501 to 1700; 1701 to 1785; 1786 to 1820; 1820 to 1860; 1860 to 1866; 1867 to 1900; 1901 to 1920; 1920 to date.

It might be appropriate to invite the Library of Congress to co-operate with the Congressional Research Service in the planning and execution of this part of the study. A photographic section might also be considered.

Impacts of water quality on the quality of life

Several approaches are necessary to deal with the complex subject of the social consequences of water quality. One necessary approach is an analysis of the process by which water quality is progressively degraded. According to this process, successive levels of degradation in water quality impose increasing economic and social costs, make more difficult the process of restoration, and encourage further pollution. Thus, costs of potable water rise, industrial uses require pre-treatment, adjacent property values decline, health effects become more serious, esthetic values diminish, commercial fishing becomes unprofitable, tourism declines, and even local recreation use is denied. These effects together affect adversely the tax base and make less feasible the use of tax revenues to construct sewage treatment facilities, reduce storm runoff, correct acid mine drainage, and to take other necessary measures. Moreover, the need for tax revenues encourages laxity in applying regulation to control industrial pollution, to restrict land development practices causing erosion and silt run-off, and to restrain polluting uses of the river by boaters, and riverside residents, and farmers. Thus, the process yields greater costs and diminishes ability to pay the costs of restoration.

It is also necessary to characterize the reverse process of correction as a progressive operation, in which each stage of improvement tends to reinforce and strengthen the ability to achieve further improvement.

And finally, the economic and social costs associated with the two progressive processes—of deterioration and improvement of water quality—need to be assessed. These bear directly on the quality of life in such ways as the following: denial of recreation facilities to local people, increased cost of potable water, injury to health, esthetic costs, conflict between upstream and downstream users and residents, increased costs and scarcity of good foods, loss of employment opportunity, and encouragement of careless use of land and water alike.

Geologic resources of the Potomac Drainage Basin

This topic would deal with such subjects as follows:

Geographic organization of the Potomac Basin into four sub-regions, as follows:

⁴ The reverse side of each map could describe in greater detail the events located on the map, with cross-reference to the appropriate abstracts in the text.

Tidewater: Maryland—Virginia—D.C.

Upper Main Stream: Maryland—Virginia.

Northwest subregion: West Virginia, Maryland, Pennsylvania.

Shenandoah subregion: Parts of central Virginia and a small portion of West Virginia:

Coal resources for an energy-hungry nation (problems and opportunities).

Metallics,

Shale for cement-making,

Limestone and silica,

Building stone, sand and gravel,

Rock formations as water storage,

Soils for crops, forage, and forests,

Problems of siltation,

Historical geology—fossils and interesting formations,

Geology that shapes the river and its basin, and its scenery,

Archeological resources of historic and prehistoric cultures in the Basin.

Fish, crabs, oysters, and other valuables

The concept of this topic is to encompass the activities and products of commercial fishing and sport fishing as competing (and sometimes disruptive) activities on the river; the study should address the problems and opportunities relating to marine resources that good management of the river and its basin could deal with. The study should locate productive sections of the river and its tributaries, by time periods, giving quantitative data on catches where possible. The record should also show where marine life is too contaminated to be safe for food, and show trends in this defect by time periods. Natural pollution (e.g., Hurricane Agnes) should be dealt with. Attention should be given to both spawning and harvesting areas. Projection of trends and their effects on marine life should be discussed to the extent feasible. The economics of commercial fishing in the lower estuary should be evaluated in comparison with sport fishing and related recreation throughout the entire Basin. Attention should be given to the interaction of fishing with agriculture, with particular reference to the effects of run-off containing silt and pesticides. What has been and might be the role of the Bureau of Land Management or the Soil Conservation Service in this regard? How have the States dealt with this matter? What Federal and State programs have been instituted to enhance the value of fish catches and the availability of sport fishing in the Basin?

Agriculture in the basin

This study could identify opportunities for improved agricultural practice in the Potomac Basin. What actually is grown in the four sub-regions of the Basin? What *could* be grown? What are the quantitative facts and qualitative characteristics of Basin farmers? What general problems are encountered, and what might be done generally to enhance Basin agriculture (in the way that TVA enhanced agriculture in the Tennessee Valley by emphasizing phosphate fertilizer)? How good are marketing arrangements and facilities? Do food consumption patterns in principal metropolitan areas in and near the

Basin act favorably on farming, and do farmers serve these areas with truck? What major cash crops does the regions support, and are there other crops that warrant attention? How much farm land should (technically) revert to forest, and what forested land is cultivable? What happens if tobacco land becomes uneconomic—how much tobacco is grown (product, acreage, and number of farms) in the Basin? What circumstances and factors determine and govern the competition for farm land to be converted into urban and suburban developments or other intensive uses, and with what consequences for the Basin? Is prime agricultural land being converted into subdivisions? What assessment might be made of “no-till” cultivation to strengthen Basin agriculture? How serious an issue is agricultural run-off and siltation, or pesticide and fertilizer pollution from agriculture that impacts on water quality? How might agriculture and water management be best brought into harmony?

Forests and forestry in the basin

The major part of the Potomac Basin (nearly two-thirds) is in woodland, yet wood industries contribute only a negligible part of the income of the Basin. How effective are forestry programs in the Basin and what more might be done? How much of the wood acreage is in good quality timber, apart from areas reserved for camping, State parks, nature reserves, and the like? What is the relationship between the geography of the Basin and the kinds of forest growth now being supported? What different zones are there, and what would be the optimum pattern of forest growth for each zone? What sort of program might maximize the utility of present and prospective forestry practice, in terms of multiple use (to grow timber, stabilize run-off, control soil erosion, enlarge recreational areas and useage, provide source material for small local industries e.g., Christmas tree growing and increase the diversity of fruit and nut products)? What marketing practices and facilities might improve the economics of upland orchards? Exploration by a competent analyst of questions like these could point the way to major improvement in the economy of the Basin.

Recreation and entertainment, along the river and in the basin

Three sorts of ecological entertainment are involved: those that make use of the waters, the mountains, the caves, the forest, for entertainment (e.g., cave exploring); those that the ecology enhances or permits (e.g., country music festivals); and those to which the ecology is irrelevant (e.g., television programs).

The third category of recreation can still be considered in terms of its impacts on the environment of the Basin. The second category has particular reference to activities most characteristic of parts of the Basin, like horse shows and hunts, auctions, antique and craft fairs, art shows, and the like; these help to give the regions its character, attract visitors, and bring the local people together. Most important, however, is the first category with its myriad of examples: fishing, crabbing, sailing, in the lower estuary; swimming, sailing, water skiing, canoeing, and bird watching on lower bays and inlets; rafting, boating, slack and white water canoeing, fishing, swimming, and numerous other aquatic activities on the upper main stem and major tributaries; sport fishing on smaller streams; visits to innumerable historical places and battle sites; hiking, camping, bicycling, touring,

nature walks, rock hounding, rock climbing, winter skiing and other snow sports in the mountains and uplands. Archeological exploration throughout the entire Basin is an important and expanding interest.

Perhaps an effective way of portraying these many forms of entertainment afforded by the Potomac Basin might be to present a series of maps of the Basin indicating places where these activities are enjoyed. Or possibly a series of transparent overlays, showing in a cumulative way the rich opportunity for recreation in the Basin.

Analysis of these activities should take notice of the economic aspects of some forms of recreation, but also of conflicts between different kinds of use (for example, as between speed boating and water skiing on the one hand and fishing or canoeing on the other; or as between auto touring and bicycling, or the use of motorcycles on hiking trails). In a large area like the Basin, room can be found for many different sports and recreation, so that they need not conflict but adjustment of this kind implies careful planning and a willingness to compromise.

What strands tie the basin together?

The hypothesis of a geographic regional approach to the management of resources is that there are commonalities of interests throughout the region, shared values, and actual physical linkages. The waterway and its drainage system that define the Potomac Basin is one such linkage. Others are a shared National Government, a common highway system, postal system, telephone, radio and television, weather forecasting, newspapers, magazines, churches, fraternal orders, etc., etc. An inventory of these natural, technological, and social linkages shared by the people who live in the Basin might help to show how a regional system might be designed and presented to them in an acceptable way.

The discussion of linkages might be counterpoised against a discussion of the elements that can operate to divide or separate the residents in different parts of the Basin, with respect to their conflicting values, interests, goals, life styles, and other factors.

Who are the people and what do they want?

A central aspect of the Basin is the anthropology of the present day. A study is needed about the various groups of people who live in the region, with attention to such factors as the following:

- When arrived in the Basin,
- Ethnic backgrounds,
- Religions,
- Occupations,
- Commitments to the ecology,
- Social linkages:
 - political,
 - economic,
 - other;
- Education,
- Entertainments,
- Mobility (in and out of the Basin),
- Products,
- Dependence on Basin resources,

Prospects for change in factors (and discussion of past changes),
Orientation:

to the past,
to the future external,
to the Basin.

What relationships are there between people and the sub-regions within the Basin (i.e., estuary, upper main stem, small tributaries, northwestern subregion, the Shenandoah Valley and the several mountainous areas)? What particular changes would people in these various sub-regions favor or oppose, and why? What are their personal aspirations and to what extent are they generally shared?

Possibly the organization of this study should include a general overview, followed by separate discussion of the views and wants of the people in the separate subregions, as follows:

Shenandoah Subregion (all Va.),
Northwest Subregion (W. Va., Penna., Md.),
Upper main stem Subregion (Md., Va.),
Tidewater (Md., Va., D.C.).

Impacts of man; structures, industries and sprawl

Over the years man's presence in the Potomac Basin has worked many changes. The purpose of the study should not be to view with alarm and dismay or condemn the actions of the past. A straightforward factual account of the changes in the Basin, in terms of the following factors, consequent on man's settlement, movement, resource exploitation, and other uses, should be presented:

Quality of water,
Forests,
Animal life, land and aquatic,
Air quality,
Agricultural productivity,
Other.

Without assigning values to these changes, it should still be possible to indicate probable future trends in these same factors.

What are the options in the total management of the basin?

A region can be managed in an infinite number of different ways: by leaving everything to chance and the marketplace, by rigid control over all uses of land and water, and by various intermediate degrees of control or motivating influences. The precise degree of control to be achieved might perhaps be balanced against individual and community freedom of choice to enable resolution of conflict by compromise in the selection of courses of action yielding the optimum benefit to all.

The principles that would seem applicable to achieve a total rational distribution of costs and benefits relating to all the resources of the Potomac Basin are the following:

- (1) Total participation of all people in the Basin in decisions affecting the whole Basin.
- (2) Proportional voice of affected groups in accordance with severity of impact of decisions.
- (3) Federal assistance to ease the local severity of impacts of decisions affecting the whole Basin.

(4) State assistance to ease the local severity of impacts of decisions affecting areas within single States.

(5) Professional planning and studies iteratively conducted to achieve optimum effectiveness in the total pattern of resources of the entire Basin.

(6) Systematic education and open discussion of all comprehensive plans.

(7) Provision of compensatory benefits generously extended to overmatch costs to particular affected groups of generalized Basin or subregional programs.

(8) Maintenance of performance standards to provide a model of excellence for the future.

(9) Rate of change to be considered of less significance than direction of change.

(10) Irreversible decisions to warrant much closer scrutiny and public approval than reversible decisions.

In the implementing of these principles, it would also seem necessary to decide on a workable system to determine the actual desires of the people in the Basin. Today decisionmaking is divided among a host of Federal agencies, agencies of four States and the District of Columbia, parts or all of 21 counties and many municipal jurisdictions, various other political subdivisions, commissions, and the like, and innumerable voluntary associations and groups.

There is no single authoritative voice to ascertain or express the will of the entire Basin, or to apply the ten principles suggested above.

It would seem desirable that all interested elements should have a voice in the planning and the decisionmaking, but also that the end product should be a comprehensive, workable, and equitable plan of action for the entire region. Achievement of this general goal, however, implies both the need for great political skill and a willingness to achieve progress slowly.

What are the costs, who pays them, and what do they get in return?

The essence of the political process is the determining of "who gets what, when, where, how?" "What" one gets may be a benefit or a cost. The process of planning is the achievement of an equitable and durable assessment of costs and benefits; the process of politics is the achievement of acceptance by the affected public of the proposed assessment and its consequences.

Accordingly, the thrust of this topic should be an analysis of the interface between the planners and the politicians, and an exploration of mechanisms by which costs and benefits are defined and calculated.

What rewards accrue to the entire Nation from a well-planned river basin program?

The point of this topic is that a Federal program to encourage and support an activity located within one geographic part of the Nation needs to be shown to be beneficial to the whole Nation in a degree commensurate with its cost to the whole Nation. A thorough examination is accordingly needed of all potential costs and benefits to the entire Nation of regional development and river basin development in general, and of development of the Potomac Basin in particular. Why should the citizen of Illinois, or California, or Hawaii, for example, have a stake in programs to develop the Potomac Basin, or any of its

sub-regions? What constraints on Federal participation in the planning process and in the support for the implementation of plans are implied by the need for benefits to be nationwide as well as region-wide.

Step by step approaches to basin betterment

The scheduling of change in a region presents many interesting challenges. Even if one assumes the existence of a well-thought-out, comprehensive, and politically acceptable plan for the region, there still remains the matter of scheduling its implementation. A study of this problem is an essential element of the overall analysis of Potomac Basin development.

Among the considerations governing the scheduling of projects are at least the following:

(1) Distribution of local and subregional projects timed to extend employment opportunities, other economic benefits from construction, and benefits from completed projects on an equitable geographic basis.

(2) Technical scheduling of related projects.

(3) Priority to projects that arrest conditions currently resulting in injury to the Basin—especially if irreversible.

(4) Initial scheduling of projects judged most acceptable to those affected.

(5) Early scheduling of projects returning most substantial rewards (economic or other) to the entire Nation.

(6) Balanced scheduling so that the total portfolio of projects underway at any one time is demonstrably cost/effective.

(7) Total rate of progress to be manageable in terms of its use of resources, and also in terms of possible temporarily adverse impacts on the environment, inconvenience to local groups nearby, and other political stresses.

(8) Rate of progress on individual projects to be such as to minimize intensity or duration of adverse effects of the projects on local communities.

Analysis of the interaction of various scheduling factors is also important. Frequently, benefits will be aggregative, or will be balanced against concurrent costs; but benefits to one group do not necessarily result in general acceptance when there are concurrent costs to another group. The principles involved in such balancing need to be explored thoroughly.

V. PLAN FOR A FINAL REPORT

It is envisioned that upon completion of the series of individual studies and reports listed in the preceding chapter of this Prospectus, a final report on the entire CRS Potomac Basin Study will be assembled. Its outline will be somewhat along the following lines:

Format of final report, CRS Potomac Basin study

The final report will consist of four sections. The first will be introductory material, restatement of the problem, a resume of the context and a formal description of the Potomac Basin as the subject of the study.

The second section will recapitulate briefly in sequence the individual studies in the project.

The third section will consist of a series of cross-cutting analyses, as enumerated below, in which all pertinent facts and observations assembled in the individual studies will be brought to bear on approximately six topics.

The fourth and final section of the report will gather together the principal conclusions, observations, and legislative options derived from the entire Project.

Proposed cross-cutting studies

A useful research device is the drawing from each of the studies in the series those common elements that warrant special attention. A series of essays dealing with a number of these common elements is envisioned. It is not useful to attempt to forecast this second series of elements in advance, because they ought to evolve out of the project itself. Accordingly, the following six elements are offered merely as illustrative of the process.

1. Data Base For Planning

Contents: An essay identifying the quantitative factual data tabulations in the series of studies, together with conclusions and observations as to their significance, and suggestions as to other data series that would be helpful in planning the development of the region.

2. Implications For The Future

Contents: An essay rendering coherent all the future-oriented data, observations, projections, and conclusions of the study series.

3. Opportunities, Dangers, Motivations

Contents: An essay on motivational factors derived from the study series. Basically, it would seek to answer the questions "why?" and "why not?" Emphasis in the discussion of opportunities would be on the advantages resulting from new initiatives—gains that would require new action. Emphasis in the discussion of dangers would be on irreversible adverse consequences both of the unchanged present courses of action and on those changes proposed that might invite new,

irreversible, adverse consequences. The discussion of motivations might take the form of a matrix analysis of different groups and categories of beneficiaries and the potential benefits accruing to each as the outcome of a comprehensive program.

4. Issues To Be Resolved

Contents: An essay collecting from the study series an orderly arrangement of the major issues discussed, identified, or suggested by the study series. The commentary on individual issues might take such a form as the following:

Statement of the issue,
The issue discussed,
How it arose,
Significance of the issue,
Responsibility for its resolution,
Options and their consequences.

5. Legislative and Administrative Options

Contents: Two lists, identifying (1) legislative initiatives to effect actions toward the identified goals for the Potomac Basin, and (2) administration programs or actions, pursuant to existing legislative authorities, to effect results contributing toward these same goals.

6. Priorities Of The Public and The Experts

Contents: An essay contrasting the criteria applied by the public with those employed by the "experts" in regional planning and development, and then contrasting the public's perceived priorities with those of various professional groups (agriculture, forestry, minerals, hydrology, land use, civil engineering, environment, etc.). Possibly to be followed by one or more suggested priority systems, based on explicit hypotheses, that reconcile views of the public with those of the "experts," taken together.

VI. ELEMENTS OF AN ACTION PLAN FOR THE POTOMAC BASIN

A plan for development of a region is of no substance until it has received (a) the approval of those persons affected by its implementation, (b) the approval of those persons whose efforts are required for its execution, (c) the approval of the political decisionmakers having jurisdiction over all or parts of the affected region, and (d) the legislative authority and financial support necessary to complete the planned program of action. In short, a plan for the building of a consensus is the first phase of an action plan for development of a region.

The building of a consensus, in turn, would seem to require a comprehensive understanding of the attitudes and wants of those persons in the first three of the four categories listed in the preceding paragraph. The motivations required for four sets of approvals need to be identified and built into the design of the action plan. Moreover, it is not enough that a majority of the people and institutions of the entire Basin reach a consensus on the major issues in question. Each of the major subsystems of the Basin would need to achieve a consensus on the issues of primary concern to them. And, indeed, the consensus of affected groups in local areas affected by particular issues may be essential.

Another requirement is that all interested parties be made fully aware of those features of the plan of primary concern to each party, why these features are considered important, the relation of each important feature to the total plan, and why the effective interaction of all such elements of the plan is essential to the achievement of generally accepted goals.

Finally to the extent that substantial Federal support and activity was called for, the acceptance of the plan by a national constituency should probably comprise a separate element of the action plan.

APPENDIX

Correspondence Concerning the Projected CRS Study of Regional Planning for the Potomac Basin

THE LIBRARY OF CONGRESS,
CONGRESSIONAL RESEARCH SERVICE,
Washington, D.C., May 27, 1977.

HON. THOMAS F. EAGLETON,
U.S. Senator,
Washington, D.C.

DEAR SENATOR EAGLETON: This is my reply to your joint letter of May 20, in which you call for a major, long-term project by the Congressional Research Service to:

"Examine the circumstances that make the Potomac a wasting resource, ascertain the forces that operate to improve or worsen its social value, and identify long range legislative initiatives to coalesce and activate the forces for its betterment."

The goal set forth in your letter is an open-ended one:

"To set in train a process that could operate for a century, steadily improving the entire Potomac Basin from headwaters to estuary, toward the goal of a clean and living symbol of beauty and environmental quality for all the Nation to enjoy."

In your letter you asked me to (a) indicate my acceptance of the task on behalf of CRS, (b) describe my plans for the assignment of responsibility for preparation of the prospectus delineating the project, and (c) assess the feasibility and desirability of undertaking it.

My acceptance, for CRS, of the project is unhesitating. We will proceed at once.

With respect to the assignment of responsibility for the task, it is evident at the outset that it will involve a number of divisions of CRS; at a minimum these will include: Environmental Policy; Science Policy Research; Government; American Law; Economics. Accordingly, I have asked Dr. Franklin P. Huddle, a senior specialist, to coordinate the planning and to direct the project as my personal representative.

Dr. Huddle's qualifications for this assignment are as follows: credentials as senior specialist in science and technology, doctorate in political science, widely published in regional development topics, and CRS experience with four major projects over the past decade. (These have been the study *Technical Information for Congress; National Science and Technology Policy; Science, Technology, and American Diplomacy; and National Materials Policy.*)

I propose to interest myself in this project to the extent permitted by the other claims on my time. I think you will agree that this project will be breaking new ground as far as the Congressional Research Service is concerned. If we are able to carry it off at the high professional level stipulated in your letter of May 20, it will demonstrate

a new dimension in service to the Congress as well as a contribution to the management and governance of an important national resource.

There can be no question as to the desirability of the goal set forth in your letter of May 20. I am confident it is one we all share.

Whether the high aspiration of a century of progress is feasible, I suggest, will depend on many imponderables that lie outside of our professional competence to foresee. However, I am unaware at this time of any reason why the project is infeasible. Because it is open-ended, the project calls for steady, sustained advance at an unspecified rate. Manifestly, the rate of progress ought to be sufficient to stimulate, encourage, reward, and sustain the participants. In the development of our prospectus we will give attention to this requirement.

And finally, I undertake to assure you of our deep interest in the task you have requested. The prospectus will be in your hands by the close of summer, 1977.

Most sincerely,

GILBERT GUDE,
Director, Congressional Research Service.

U.S. SENATE,
COMMITTEE ON GOVERNMENTAL AFFAIRS,
Washington, D.C., May 20, 1977.

Hon. GILBERT GUDE,
*Director, Congressional Research Service,
Library of Congress,
Washington, D.C.*

DEAR MR. GUDE: We would like to request that the Congressional Research Service consider a broad indepth study of ways to achieve the total betterment of the Potomac River Basin. Washington, our Capital, is the major metropolitan center occupying a key position astride the River at the fall line. The deterioration or improvement of the water quality; the direction of growth; and, the social and economic development of the entire Potomac valley are of utmost significance to the Capital and the Nation.

Since the mid 1930's, the Potomac River, flowing near the heart of the city, has deteriorated in quality. Many individuals and groups have attempted to reverse the trend. There has been a plethora of studies and projects dealing with one or another of the Potomac's many problems. But, for whatever reasons, the results have not given us a clean river, an esthetically sound and benign environment, a safe and healthy recreational facility, or an assured quality of potable water.

We request that CRS examine the circumstances that make the Potomac a wasting resource, ascertain the forces that operate to improve or to worsen its social value, and identify longrange legislative initiatives to coalesce and activate the forces for its betterment.

It is overly optimistic to hope for an instant solution to a problem that has been decades in the making. Our thought is to set in train a process that could operate for a century, steadily improving the entire Potomac Basin from headwaters to estuary, toward the goal of a clean and living symbol of beauty and environmental quality for all the Nation to enjoy. Such a study must be a careful, deliberate, and many-sided examination of the total Basin problem. We understand such a

project will require a sustained effort of as long as three or more years, enlisting the services of experts in CRS and from the scientific and technical community as appropriate.

The long time-span suggested for the project reflects our concept that the project will be built up from separate studies by different authors or groups, with each study allowed to mature at its own pace, before being integrated into a final overall report. We recognize that the duration of the total project must relate to the number of individual studies undertaken. Accordingly, since we desire the entire project to be comprehensive and thorough, we should insist that it not be pushed to meet an early deadline.

We hope that a prospectus for this project be prepared and supplied to us by September 1977; after we have examined and discussed the project with you and your participating staff, a further determination will be made as to required support and possible supplemental funding required to complete it. In addition, we wish to be assured that all relevant elements of the Executive Branch stand ready to cooperate to the fullest extent in the conduct of the project. An enumeration of such participation should be a part of the prospectus.

May we hear from you as to your acceptance of this undertaking, your proposed assignment of responsibility for preparing the prospectus, and your general assessment as to the feasibility and desirability of the project?

Sincerely,

CHARLES McC. MATHIAS, Jr.,
U.S. Senator.
 THOMAS F. EAGLETON,
U.S. Senator.



